Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Canceled) Apparatus for determining accurately liquid level in a container by providing a signal and/or signals indicative of the level to which said sensor is submerged in a liquid, said apparatus comprising:

a common heater wire and configurations of temperature sensors secured along the longitudinal axis of one face of a substrate;

said common heater having uniform or non-uniform cross-section provided on either side of said substrate;

a plurality of temperature sensors located at strategic vertically spaced points and located very close to the common heater on one side of said substrate;

said temperature sensors are plurality of thermocouples with hot and cold junctions connected serially or in parallel configuration;

said plurality of hot thermocouple junctions provided on one side of said substrate in longitudinally spaced relationship and are located very close to said common heater;

a single cold thermocouple junction for said parallel thermocouple configuration and/or a single common hot thermocouple junction provided on said one face of said substrate;

a plurality of cold thermocouple junctions for serially connected thermocouples

provided on one side of said substrate in longitudinally spaced and positioned in a laterally spaced relationship to said plurality of hot thermocouples junctions;

isothermal block means for keeping said cold junction of serially connected thermocouple at the same temperature;

coating of said heater, said temperature sensors and two sides of said substrate is thermally conductive, electrically insulating, chemically inert to the operating liquid, slippery and liquid impermeable;

means for applying electrical power to heat said common heater wire, controlled by a power control switch and power circuitry, wherein both ends of said common heater wire are connected to said electrical power applying means for heating by continuous or discrete electrical pulses of said common heater;

said apparatus is positioned within a vessel containing a volume of liquid with said substrate partially immersed in said liquid such that said hot and cold junctions of plurality of thermocouples will generate a signal from said parallel or serial thermocouples configurations, indicative of the level of liquid within said vessel;

display means for indicating the liquid level in said liquid container;

a data acquisition means comprising a microprocessor and or a signal conditioning circuit connected to said thermocouples and display means for indicating said liquid level from one of voltage and temperature sensed by said thermocouples; and

said power and signal conditioning circuitry are provided on said substrate.

2. (Canceled) A method for accurately determining the density and pressure change of compressible fluid and the liquid parameters of level, absolute temperature and viscosity degradation in a three dimensional liquid container, said method comprising of three components on a monotonic profile namely:

a line along most of the lineal dimension of the sensor that is immersed in liquid;

a line along a significant portion of the lineal dimension of the sensor that is in air or other medium above the liquid;

a steep or shallow curved line connecting said two lines;

reading of a point or a few points along each of said three components will be used to construct said profile;

adding, averaging or interpolation of said readings from said points determine with different accuracy the said density and pressure changes, liquid level, absolute temperature and viscosity degradation.

3. (Canceled) The method recited in claim 2 wherein said monotonic profile is a voltage or temperature profile, each of its three components is constructed from reading of one or more hot thermocouple junctions after power is applied to the heater and after zeroing one of the voltage and the temperature reading from all of the hot thermocouple junctions while the cold junctions temperature remains equal and constant for all of the cold thermocouple junctions.

4. (Canceled) The apparatus recited in claim 1, wherein said common heater is an electrically pulsed heater and a common wire for the hot and cold junction of parallel

configuration of thermocouples.

5. (Canceled) The method recited in claim 2 wherein the determining step includes detecting the presence of two or more different stratified liquids, such as oil and water, and determining the level of each liquid.

6. (Canceled) The method recited in claim 2 wherein the determining step includes detecting the level at pre-set points at one of the bottom and top of liquid containers such as oil pans, fuel tanks and coolant reservoir.

7. (Canceled) A data acquisition system comprising:

an analog power circuitry connected to the heater and an analog signal conditioning circuitry with self- calibrated differential amplifier is connected to all possible configuration of thermocouples;

a first and second multiplexers for odd and even thermocouples connected to said configuration with parallel thermocouples;

wiring of said multiplexers to an analog signal conditioning circuitry and a single differential amplifier and analog to digital converter;

said analog to digital filter wired to a microprocessor;

said microprocessor wired to the apparatus recited in claim 1, and a display through a serial port and digital to analog input/output;

said microprocessor connected to a health monitoring electronic circuitry for the apparatus in claim 1;

said microprocessor connected to a power supply circuitry capable of having a power

switched on and off;

said microprocessor comprise of algorithms for signal conditioning and signal processing.

8. (Canceled) A data acquisition system as recited in claim 7, further comprising software used with the microprocessor of said data acquisition system, capable of eliminating non-random electronic hardware errors and minimizing random errors in differential voltage reading of said thermocouples.

9. (Canceled) A data acquisition system as recited in claim 7, further comprising of software capable of determining absolute temperature of each said thermocouples using said differential voltages.

10. (Canceled) A data acquisition system as recited in claim 7 , further comprising of software determining the kind of liquid based on curvature of the temperature profile and the rise of temperature of the thermocouples in liquid, and thermocouples in air.

11. (Canceled) The apparatus recited in claim 1, wherein said one or more of the hot thermocouple junctions are covered by a dome;

12. (Canceled) A data acquisition system as recited in claim 7, further comprising of algorithm determining the presence of ice on any section of one of horizontal and vertical inclined surfaces.

13. (Canceled) A data acquisition system as recited in claim 7, further comprising of algorithm determining the existence of a time-delay of differential voltage time behavior of each thermocouple.

14. (Canceled) A data acquisition system as recited in claim 7, further comprising of algorithm determining the steady-state differential voltage for each thermocouple closeness to the steady-state voltage of thermally isolated hot thermocouple under a dome.

15. (Canceled) A data acquisition system as recited in claim 7, further comprising of algorithm determining the response time of the differential voltage for each thermocouple closeness to the response time of the voltage of thermally isolated hot thermocouple under a dome.

16. (Amended) A liquid level sensor comprising:

a substrate having a longitudinal axis;

a first plurality of thermocouples provided on one side of said substrate in longitudinally spaced relationship;

a second plurality of thermocouples provided on said one side of said substrate in longitudinally spaced relationship to each other, respective ones of said second plurality of thermocouples being positioned in laterally spaced relationship to respective ones of said first plurality of thermocouples;

said first and second thermocouples being interconnected in alternating series relationship;

a heat source for increasing the temperature of each of said first plurality of thermocouples;

a heat sink positioned in heat transfer relationship to said plurality of second thermocouples;

said sensor being adapted to be positioned within a vessel containing a volume of liquid with said substrate partially immersed in said liquid such that said first and second plurality of thermocouples will cooperate to generate a signal indicative of the level of liquid within said vessel.

17. (Amended) A liquid level sensor as set forth in claim 31 wherein said first plurality of thermocouples generates a signal of a first polarity and said second plurality of thermocouples generate a signal of opposite polarity.

18.(Amended) A liquid level sensor as set forth in claim 16 wherein said sensor includes third and fourth serially connected thermocouples operative to generate a signal indicative of a pressure within said vessel.

19. (Canceled) A liquid level apparatus as set forth in claim 16, further comprising a regulated power source for supplying power to said common heater.

20. (Amended) A liquid level sensor as set forth in claim 16 wherein said signal from said thermocouples is supplied to signal conditioning circuitry.

21. (Canceled) A liquid level apparatus as set forth in claim 16, wherein thermocouple junctions are positioned along a line extending generally parallel to the surface of said liquid.

22. (Original) A method for accurately determining the density and pressure change of compressible fluid and the liquid parameters of level, absolute temperature and viscosity degradation in a three dimensional liquid container, said method comprising of three components on a monotonic profile namely:

a line along most of the lineal dimension of the sensor that is immersed in liquid;

a line along a significant portion of the lineal dimension of the sensor that is in air or other medium above the liquid;

a steep or shallow curved line connecting said two lines;

reading of a point or a few points along each of said three components will be used to construct said profile;

adding, averaging or interpolation of said readings from said points determine with different accuracy the said density and pressure changes, liquid level, absolute temperature and viscosity degradation.

23. (Original) The method recited in claim 22, wherein said monotonic profile is a voltage or temperature profile, each of its three components is constructed from reading of one or more hot thermocouple junctions after power is applied to the heater and after zeroing one of the voltage and the temperature reading from all of the hot thermocouple junctions while the cold junctions temperature remains equal and constant for all of the cold thermocouple junctions.

24. (Canceled) The apparatus recited in claim 16, wherein said common heater is an electrically pulsed heater and a common wire for the hot and cold junction of parallel configuration of thermocouples.

25. (Original) The method recited in claim 17, wherein the determining step includes detecting the presence of two or more different stratified liquids, such as oil and water, and determining the level of each liquid.

26. (Original) The method recited in claim 22, wherein the determining step includes detecting the level at pre-set points at one of the bottom and top of liquid containers such as oil pans, fuel tanks and coolant reservoir.

27. (Original) A data acquisition system comprising:

an analog power circuitry connected to the heater and an analog signal conditioning circuitry with self-calibrated differential amplifier is connected to all possible configuration of thermocouples;

a first and second multiplexers for odd and even thermocouples connected to said configuration with parallel thermocouples;

wiring of said multiplexers to an analog signal conditioning circuitry and a single differential amplifier and analog to digital converter; said analog to digital filter wired to a microprocessor;

said microprocessor wired to the apparatus recited in claim 16, and a display through a serial port and digital to analog input/output; said microprocessor connected to a health monitoring electronic circuitry for the apparatus in claim 16;

said microprocessor connected to a power supply circuitry capable of having a power switched on and off; and

said microprocessor comprise of algorithms for signal conditioning and signal processing.

28. (Original) A data acquisition system as recited in claim 27, further comprising software used with the microprocessor of said data acquisition system, capable of eliminating non-random electronic hardware errors and minimizing random errors in differential voltage reading of said thermocouples.

29. (Original) A data acquisition system as recited in claim 27, further comprising of software capable of determining absolute temperature of each said thermocouples using

said differential voltages.

30. (Canceled) A data acquisition system as recited in claim 27, further comprising of software determining the kind of liquid based on curvature of the temperature profile and the rise of temperature of the thermocouples in liquid, and thermocouples in air.

31.(New) A liquid level sensor as set forth in claim 16, wherein said second plurality of thermocouples are operative to generate a compensating signal indicative of ambient temperature.

32.(New) A liquid level sensor as set forth in claim 20, wherein said signal conditioning circuitry includes an amplifier.

33.(New) A liquid level sensor comprising:

a substrate having a longitudinal axis;

a first plurality of thermocouples provided on one side of said substrate in longitudinally spaced relationship;

a second plurality of thermocouples provided on said one side of said substrate in longitudinally spaced relationship to each other, respective ones of said second plurality of thermocouples being positioned in laterally spaced relationship to respective ones of said first plurality of thermocouples;

said first and second thermocouples being interconnected in alternating series relationship;

a heat source for increasing the temperature of each of said plurality of first thermocouples; and

a heat sink provided on said substrate in close proximity to said second plurality of thermocouples;

said sensor being adapted to be positioned within a vessel containing a volume of liquid with said sensor partially immersed in said liquid such that said first and second thermocouples cooperate to generate a signal indicative of the level of said liquid within said vessel.

34.(New) A liquid level sensor as set forth in claim 33 wherein each of said first plurality of thermocouples generate a first magnitude signal when positioned at a level above the surface of said liquid and a second magnitude signal when positioned at a level below said surface of said liquid, the sum of said first and second magnitude signals being

indicative of the level of said liquid within said vessel.

35.(New) A liquid level sensor as set forth in claim 34 wherein said second plurality of thermocouples generate a signal indicative of the ambient temperature within said vessel.

36.(New) A liquid level sensor as set forth in claim 33 wherein said heat sink is provided on said substrate on a side of said substrate that is opposite said one side of said substrate.

37.(New) A liquid level sensor as set forth in claim 33 further comprising a thermally conductive electrically insulating coating encapsulating said sensor.

38.(New) A liquid level sensor as set forth in claim 33 wherein said coating is operative to shed droplets of said liquid.

39.(New) A liquid level sensor as set forth in claim 33 wherein said heat source comprises an elongated resistance heater.